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Guide to Operations

Galaxy S Series
14 S CO_2 Incubator

MANUAL No: CO14S-0050
Revision B
February 16, 2010

New Brunswick Scientific PO Box 4005 44 Talmadge Rd. Edison, 08818-4005 USA
1.800.631.5417 1.732.287.1200 bioinfo@nbsc.com **www.nbsc.com**

INTERNATIONAL OFFICES:

BELGIUM
New Brunswick Scientific NV-SA
Stationsstraat 180/4
3110 Rotselaar
België/Belgique
Tel: +32 (0)16 56 28 31
Fax: +32 (0)16 57 27 53
E-mail: sales@nbsnv-sa.be

CHINA
New Brunswick Scientific
A903 Yin Hai Building
No. 250, Cao Xi Road
Shanghai 200235, P.R. China
Tel: +86 21 6484 5955 or 5966
Fax: +86 21 6484 5933
E-mail: nbschc@online.sh.cn

FRANCE
Eppendorf France SARL
60, route de Sartrouville
78230 Le Pecq
France
Tel: +33 (0)1 30 15 67 40
Fax: +33 (0)1 30 15 67 45
E-mail: eppendorf@eppendorf.fr

GERMANY
Eppendorf Vertrieb Deutschland GmbH
New Brunswick Produkte
Peter-Henlein-Strasse 2
D-50389 Wesseling-Berzdorf
Deutschland
Tel: +49 (0)2232 418 0
Fax: +49 (0)2232 418 155
E-mail: vertrieb@eppendorf.de

THE NETHERLANDS
New Brunswick Scientific BV
Kerkenbos 1101, 6546 BC Nijmegen
Nederland
Tel: +31 (0)24 3717 600
Fax: +31 (0)24 3717 640
E-mail: sales@nbsbv.nl

UNITED KINGDOM
New Brunswick Scientific (UK) Ltd.
17 Alban Park, Hatfield Road
St. Albans, Herts. AL4 0JJ
United Kingdom
Tel: +44 (0)1727 853 855
Fax: +44 (0)1727 835 666
E-mail: bioinfo@nbsuk.co.uk

CAUTION!

This equipment *must* be operated as described in this manual. If operational guidelines are not followed, equipment damage and personal injury *can* occur.

Please read the entire User's Guide before attempting to use this incubator.

Do not use this equipment in a hazardous atmosphere or with hazardous materials for which the equipment was not designed.

New Brunswick Scientific (NBS) is not responsible for any damage to this equipment that may result from the use of an accessory not manufactured by NBS.

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New Brunswick Scientific
Box 4005 44 Talmadge Road
Edison, New Jersey 08818-4005

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Manual Conventions

NOTE: **Notes contain essential information that deserves special attention.**

CAUTION! ***Caution* messages appear before procedures which, if caution is not observed, could result in damage to the equipment.**

WARNING! ***Warning* messages alert you to specific procedures or practices which, if not followed correctly, could result in serious personal injury.**

WARNING! **This particular *Warning* message represents a potential electrical hazard.**

This particular *Warning* message, whether found in the manual or on the incubator means HOT SURFACE–and therefore represents a potential danger to touch.

CRUSH WARNING! ***Crush Warning* messages alert you to specific procedures or practices <u>regarding heavy objects</u> which, not followed correctly, could result in serious personal injury .**

This symbol on the incubator is a reminder that it is of essential importance to read the user manual.

WARRANTY
Every Instrument manufactured by
New Brunswick Scientific (NBS) is warranted to be free
from defects in material and workmanship. This apparatus, with
the exception of glassware, lamps and electrodes (where supplied),
is warranted for 2 years against faulty components & assembly and
our obligation under this warranty is limited to repairing or replacing
the instrument or part thereof which shall within 2 years following
date of shipment prove to be defective after our examination.
Incubator accessories are warranted for 1 year. This warranty does
not extend to any NBS products which have been subjected
to misuse, neglect, accident or improper installation or
application; nor shall it extend to products which
have been repaired or altered outside the NBS
factory without prior authorization from the
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1 INTRODUCTION

The Galaxy 14 S CO_2 incubator is microprocessor-controlled and designed to ensure accurate and reliable operation. The incubator incorporates a simple, door-mounted touch-sensitive keypad with two individual three-digit LED displays that allow for easy programming and monitoring of the chamber conditions.

A direct heat system, utilizing a thermal heating element, completely surrounds the incubator, providing an even temperature within the chamber. The independently heated outer door is designed to ensure an even distribution of heat, thereby eliminating condensation on the door. This system ensures a rapid, controlled return to optimum chamber conditions after a door opening while also preventing any overshoot.

A solid-state infrared sensor is used to control the level of CO_2, providing excellent reliability and remaining unaffected by humidity. The CO_2 system has a semi-automatic zero function ("AutoZero") that provides a simple process to maintain an accurate level of CO_2 within the chamber.

The 14-liter, seamless, deep-drawn chamber and all internal components are manufactured from stainless steel. The non-tip shelves, shelf racks and humidity tray are easily removed without tools for thorough cleaning and are capable of being sterilized. Air circulation is achieved without the use of a fan, eliminating ductwork (a potential source of contamination), simplifying cleaning, eliminating vibration and reducing small sample evaporation within the chamber. The outer shell of the incubator is manufactured from paint-powder-coated steel to give a durable corrosion-resistant finish.

An independently controlled water tray at the bottom of the incubator allows a high, uniform relative humidity while preventing condensation in other parts of the chamber.

The incubator incorporates a two-level alarm system. The chamber-monitoring alarms are programmable and will alert you if temperature or CO_2 have not recovered within a preset time after the door has been opened. If it is not required, this system can be disarmed. The system alarms occur only if a system component problem has developed that requires user intervention to rectify. The incubator also incorporates an over-temperature safety system that operates independently from the main control system.

The Galaxy 14 S model contains many standard features usually seen as options, such as a 25mm access port to allow for seamless integration of independent probes or other equipment through the chamber. In addition, NBS has included an RS232 port as standard on all Galaxy S series incubators. This port will communicate with any computer through a hyperlink access or can be used to externally datalog the incubator through NBS software.

The incubator's direct heat system was designed with optimal use of laboratory space in mind: it allows the most efficient internal volume for the footprint of the instrument. In addition, the incubator's top panel is specifically designed to support the weight of a second identical incubator stacked directly on top of the first.

2 UNPACKING & INSTALLATION

2.1 Inspection of Boxes

After you have received your order from New Brunswick Scientific, inspect the box(es) carefully for any damage that may have occurred during shipping. Report any damage to the carrier and to your local NBS Sales Order Department or distributor immediately.

2.2 Unpacking

CRUSH WARNING!
At least two people are required to safely lift your 14 S by hand.

Disassemble the shipping crate and remove the cardboard, fitted foam and protective packing. Save the packing materials for possible future use, and be sure to save this User's Guide for instruction and reference.

Locate and remove the parts stored inside the incubator and the bag outside the incubator that contains tubing and the power cord.

If any part of your order was damaged during shipping, is missing, or fails to operate, please fill out Customer Satisfaction Form 6300 (packed in the envelope with your warranty card) and return it by fax or mail. You can also call New Brunswick Scientific's or your distributor's service department.

Using your NBS packing list, verify that you have received the correct materials, and that nothing is missing.

Table 1 on the following page outlines the accessory items that are supplied with your new incubator:

Table 1: Accessories Provided

Quantity	Item	Notes
2	Non-tip Shelves	Packed separately
2	Wire Shelf Racks (one for each side)	Packed separately
1	Humidity Tray	Packed separately
8	Silicone Rubber Extruded Rack Guards	Installed
1	White porous CO_2 Sensor Cover	Installed
1	Black Sensor Cover	Installed
6	Silicone Rubber Suction Pads	Packed in accessories bag
1	Power Cord	Packed in accessories bag
3 meters/ 9.8 feet	PVC Tubing, ~1/4-inch or 6mm bore, with an inline CO_2 HEPA-filter connected, ready for use	Packed in accessories bag
2	Hose Clips	Packed in accessories bag
4	Adjustable Feet, with locking nuts	Packed in accessories bag
4	Anti-slip Pads for adjustable feet	Packed in accessories bag
1	User Manual	Supplied

WARNING!

Anytime you touch or handle the white CO_2 sensor cover, be sure to wear gloves, and do not later touch those gloves to your face. Discard or wash the gloves.

2.3 Utilities

In order to use the incubator, you will need:

Table 2: Utilities

Utility	Requirement
Electricity	110/120V, 50/60 Hz grounded electrical supply with min. capacity of 6 amps
	OR
	220/240V, 50/60 Hz grounded electrical supply with min. capacity of 3 amps
CO_2 Gas	Cylinder with 100% CO_2 vapor withdrawal, together with a two-stage regulator for pressure control to 5 psi/0.35 BAR (up to 15psi/1.04BAR when using O_2 control)

2.4 Location

The incubator is designed to operate at a chamber temperature ranging from 5.0°C above ambient to 50°C. Be sure to avoid placing the incubator in a location that may affect its performance, such as those listed below.

DO NOT place the incubator:

- **Directly under, beside or within the air-flow of heating or air-conditioning ducts, or other drafts;**
- **Directly beside heat-generating equipment such as a heater, an autoclave or oven;**
- **Near the exhaust of heat- or cold-generating equipment (like a ULT freezer);**
- **Near a window exposed to direct, unshaded sunlight.**

Remove the incubator from the pallet and place the incubator in the working position, on a level surface capable of bearing its weight (approximately 12.5kg/27.6lbs for an empty incubator); actual operation weight will be heavier and will depend on the options installed and the material stored in the incubator).

NOTE:
If you plan to stack two incubators, be sure to factor the extra weight (second incubator plus options and contents) into your choice of location, and be sure to use the stacking stand (NBS Part #P0628-6230) for a safe installation.

The incubator is designed so that one incubator can be safely stacked on top of another identical incubator. It is not possible to put any other type of incubator or heavy apparatus on top, as the top cover is designed to support only the feet of another model 14 S.

2.5 Installing the Feet

To ensure adequate airflow for correct operation, the incubator feet *must* be installed. The feet come in two thread sizes: there are two small-thread-sized front feet and two large-thread-sized rear feet.

To insert the adjustable feet:

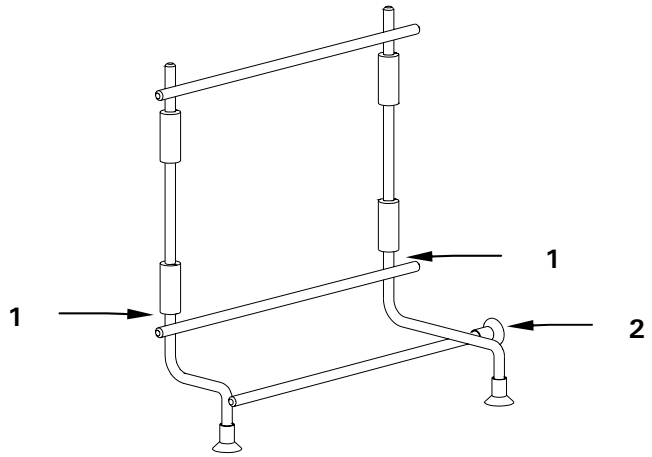
1. Make sure the locking nuts are installed onto each of the four feet provided.
2. Put an anti-slip pad (provided) on each foot.
3. Beginning with the front pair: tilt the incubator toward the back, and screw the feet in, to the required depth.
4. Tilt the incubator forward to install the rear pair of feet, in the same manner as above.

2.6 Setting Up

Install the wire shelf racks and shelves:

1. Each wire shelf rack has silicone suction cups and split tubing that hold the rack in place. Attach three of the suction feet and four of the split silicone tubing sections to each shelf rack in the positions shown below in *Figure 1*. Leave a gap of approximately 10mm (½ inch) between the bottom of the silicone tubing and the bottom shelf rung. This will allow the bottom shelf to be inserted with ease.

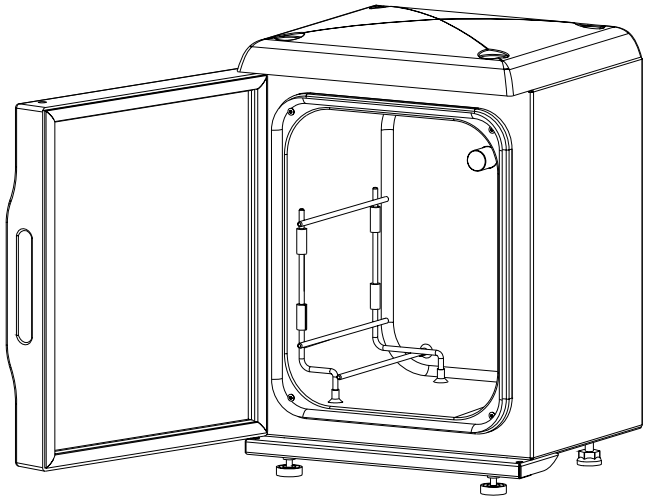
Figure 1: Shelf Rack Set-Up (left side)



1	Leave a 10mm gap here	2	Rear suction cup

2. Place the shelf racks in the incubator chamber, making sure that each rack's rear suction cup is pressed firmly against the rear of the chamber and that each piece of silicone tubing is touching the chamber wall. As you will discover, they will fit correctly only one way (*see Figure 2*).

Figure 2: Shelf Rack Installed (left side)



3. Beginning with the bottom shelf, install both shelves (*see Figures 3a & 3b)*. Make sure that each shelf's anti-tip groove is properly inserted onto each of the wire shelf rack guides. For orientation, the front edge of the shelf faces downward while the back edge of the shelf faces upward.

Figure 3: Installing the Shelves

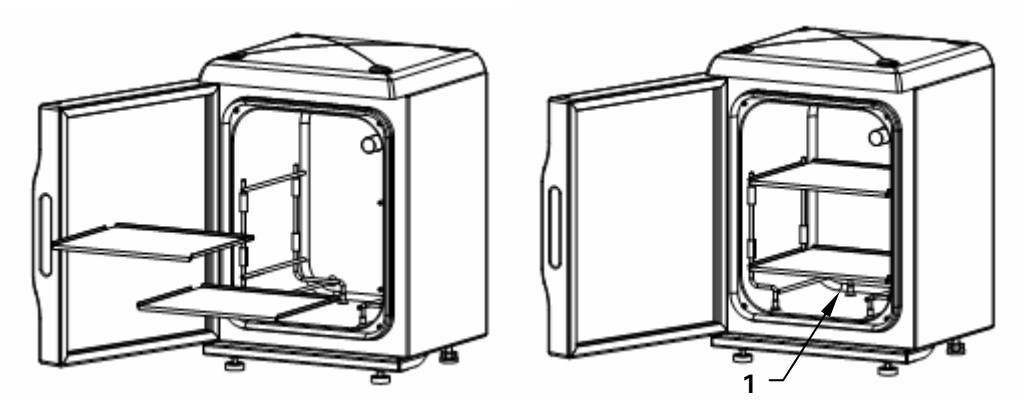


Figure 3a **Figure 3b**

1	Humidity Tray slides in here (see Fig. 4)

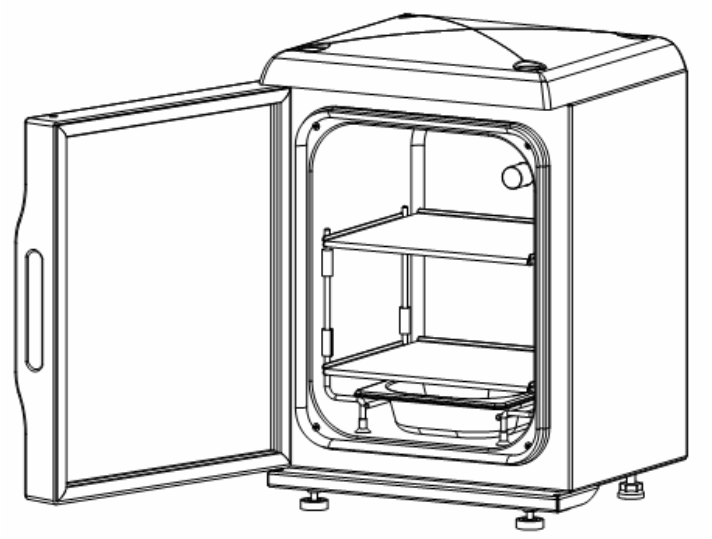
Level the incubator by adjusting the feet:

1. Place a small level on the top shelf of the incubator.
2. Adjust the leveling feet until the incubator is level and stable.
3. Lock the leveling feet in place by tightening the locking nuts on each foot.

Install the humidity tray:

1. Install the humidity tray between the lowest supports of the wire shelf racks (*see Figure 3b above and Figure 4 below).*
2. Ensure that the humidity tray is centered between the supports.

Figure 4: Shelf Racks, Shelves & Humidity Tray Installed



Connect the CO_2 gas supply:

1. Connect the incubator to the CO_2 supply using the 6mm (~¼-inch) plastic tubing, with the installed HEPA filter, by attaching the tubing between the two-stage regulator (or in-line regulator) and the matching CO_2 inlet on the rear of the incubator (*Figure 5 below).*

NOTE:
It is highly recommended that an in-line regulator be used at the incubator's gas inlets.

2. Use the tubing clips provided to eliminate CO_2 leaks.
3. Turn on the gas supply with the pressure set to 0.35 bar (5 psi).

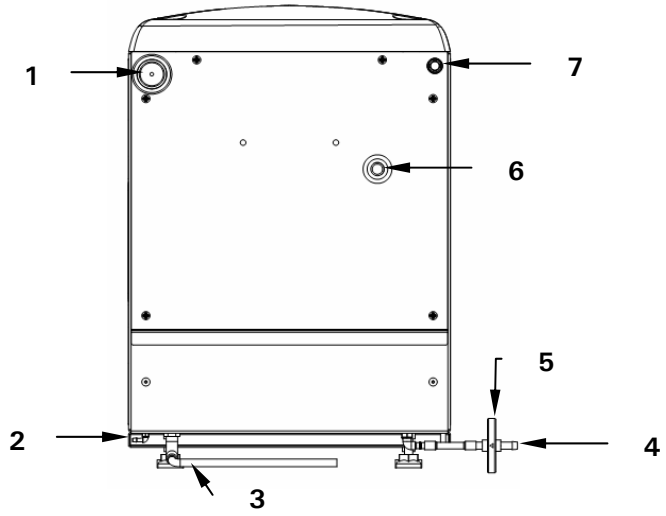
NOTE:
Be certain to check for leaks in the CO_2 connections to avoid depleting your CO_2 gas supply. This can be accomplished using a solution of soapy water applied to each fitting and checking for bubbles. If any bubbles are noted, readjust the fitting.

WARNING!
Slightly increased levels of CO_2 may be found in and around the operating area of the CO_2 incubator. Over time, this can have adverse effects on those exposed to such an environment. Users working in environments with elevated levels of CO_2 should take all appropriate precautions to protect their breathing.

4. Remove the black protective cover from sensor (store it on the back of the incubator for use when disinfecting). Ensure that the white porous sensor cover remains in place.

CAUTION!
Failure to remove the black CO_2 sensor cover will cause the incubator to operate incorrectly.

Figure 5: Rear Panel



1	CO_2 sensor cover holder	4	CO_2 gas inlet	7	4A fuse
2	CO_2 sensor cover holder	5	HEPA filter		
3	Power supply	6	O_2 sensor (optional)		

Install the power cord:

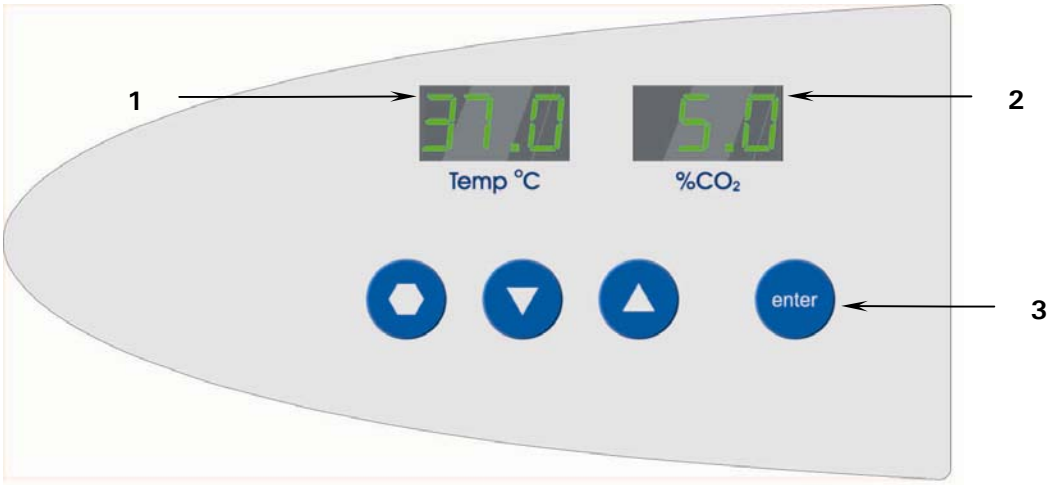
1. Insert the power cord into its receptacle on the bottom left of the incubator's rear panel (*see Figure 5 above).*
2. Press the cord firmly into its socket.

3 OPERATION

3.1 Control Panel

The control panel consists of two individual three-digit LED displays, and four function keys (*see Figure 6 below*).

Figure 6: Control Panel



1	Temperature display	2	CO_2 display	3	Function keys

Table 3: Function Keys

Key Symbol	Key Name	Function
⬣	Programming	Press this key to enter Programming mode, and to set values in either display. Press this key simultaneously with the Enter key to perform AutoZero.
▼	Down	In Programming mode, use this key to scroll down through numbered values in the display. Press this key simultaneously with the Enter key to work in the Alarm system.
▲	Up	In Programming mode, use this key to scroll up through numbered values in the display.
enter	Enter	Press this key to save a new setpoint. Press this key simultaneously with the Programming key to perform AutoZero. Press this key simultaneously with the Down key to work in the Alarm system.

NOTE:
If you accidentally press the Up & Down keys simultaneously, you will engage Engineering Mode: immediately press the Programming key (⬣) to exit.

3.2 Preparing for Operation

1. Remove the black protective cover from the CO_2 sensor (if not already removed), and store it for use later, when you clean the incubator. There is a storage holder on the rear panel of the incubator (*see Figure 5 above*).

2. Ensure that the white porous sensor cover is in place.

3. Remove the silica gel dessicant sachet.

4. Using the power cord provided, connect the incubator to a grounded power supply. The display will illuminate immediately.

NOTE:
The incubator does not contain a main power switch, and will turn on immediately when connected to a power source. If the power receptacle has a switch, make certain the power receptacle is switched on. When the incubator turns on, the decimal points on the display for Temperature and CO_2 flash on and off to signify that the Alarm System is not armed.

5. Turn on the gas supply (if not already on) with the pressure set to 5 psi or 0.35 bar (for incubators without oxygen control).

NOTE:
Be certain to check for leaks in the CO_2 connections to avoid depleting your CO_2 gas supply. This can be accomplished by applying a solution of soapy water to each fitting and checking for bubbles. If any bubbles are noted, readjust the fitting.

6. The chamber setpoints are preprogrammed at 37.0°C and 0.0% CO_2.

7. If you are not planning to humidify the incubator, leave the humidity tray in place and ***skip to Section 3.4 below***.

3.3 Using the Humidity Tray

1. Fill the humidity tray with 0.2 liters of warm (~ 37.0ºC) distilled water.

2. *For cell culture work*, we recommend the addition of one small teaspoonful (~0.11 oz/3.2 g) of copper sulphate or another recognized biocide in the humidity tray. Tests have shown that, in addition to inhibiting bacterial growth in the tray, this can reduce contamination on the chamber walls.

3. *For IVF and other sensitive work*, we do **not** recommend the use of any biocide in the humidity tray. To reduce the possibility of contamination, every 10 - 14 days the humidity tray water should be changed and the humidity tray should be cleaned with a solution of 70% isopropyl alcohol and 30% distilled water.

CAUTION!
Never leave water in the humidity tray if the incubator is switched OFF, as this may cause damage to the CO_2 sensor.

3.4 Setting Temperature & CO_2

At this time, program the desired Temperature and CO_2 setpoints. Temperature and CO_2 may be set within the following ranges:

Table 4: Temperature & CO_2 Setpoint Ranges

Parameter	Available Setpoint Range
Temperature	10ºC to 50ºC (must be at least 4ºC above ambient)
CO_2	0.2% to 20%

To set the Temperature:

1. Press the Programming (⬣) key.
2. Press the Up (▲) or Down (▼) key until the desired value appears in the lefthand display.
3. Press the **enter** key to save the setpoint.
4. Now you can set the CO_2 level.

To set the CO_2 level:

1. Press the programming (⬣) key.
2. Press the up (▲) or down (▼) key until the desired value appears in the righthand display.
3. Press the **enter** key to save the setpoint.

If at any time you wish to change the CO_2 level without adjusting the Temperature setpoint, press the Programming (⬣) key twice to work in the CO_2 display.

NOTE:
CO_2 gas will NOT be injected until the incubator reaches its temperature setpoint. Allow the incubator to stabilize at the selected setpoints for at least 2 hours before continuing.

3.5 Referencing CO_2 with AutoZero

The purpose of the AutoZero system is to reference the CO_2 sensor to an atmospheric CO_2 level of 0.05%. Over a period of time, the sensor baseline may drift, causing an inaccuracy in the CO_2 level at the programmed value.

We recommend that you AutoZero the CO_2 system:

- Prior to using the incubator for the first time
- Once a month when your incubator is operating, to ensure that the CO_2 level is as accurate as possible
- After the incubator has been in storage (or transit) for a while.

To perform the AutoZero:

1. If you have not already done so, set the CO_2 level (*see Section 3.4*). There should be an audible click when the programmed level is entered: this is the CO_2 valve opening.

2. Press the ⬣ and **enter** keys simultaneously.

NOTE:
There is a magnetic switch in the outer door, and a magnet mounted above the door, to switch off the CO_2 valve when the outer door is opened.

3. The outer door (and inner door, if present) must be opened and closed according to the displayed instructions, after which the process is completely automatic. Read the instructions that appear in the display; the inner door, if fitted, must also be opened and closed according to the displayed instructions.

4. Open the door for 60 seconds to completely degas the chamber. A countdown is shown on the display.

5. When the display instructs you to do so, close the door. An automatic 10-minute countdown will start, to allow the chamber conditions to recover and the CO_2 sensor signal to stabilize.

6. At the end of the countdown, the sensor signal will automatically be re-referenced. The incubator will reopen the CO_2 valve to allow the CO_2 level to recover to the setpoint value.

NOTE:
Pressing any key, or opening the door during the AutoZero will automatically terminate the process and control of CO_2 will restart.

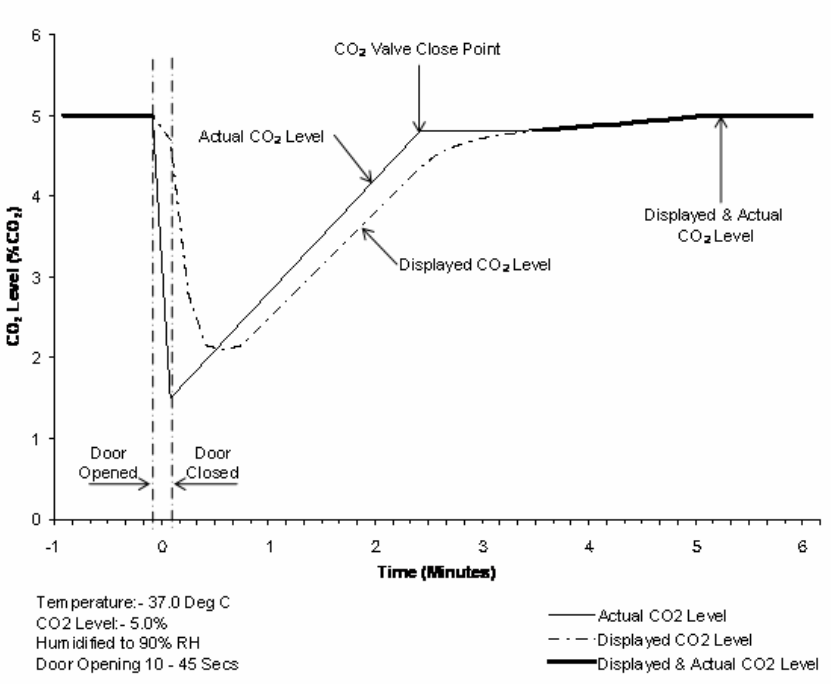
The incubator is now ready for use.

3.6 CO_2 Recovery

After a door opening, it should be possible for the *actual* CO_2 level to recover to around 4.8% in 2 to 2.5 minutes. The *displayed* CO_2 level takes 30 to 45 seconds more to catch up with the actual level. This is because it takes approximately 45 seconds from the time the gas enters the chamber to fully mix and become uniform inside the sensor.

The graph below (*Figure 7*) shows typical results for door openings between 10 and 45 seconds. The control system does this is by speeding the sensor reaction time when the door is opened and then slowing it down to produce a more accurate reading after the setpoint level is achieved.

Figure 7: Actual vs. Displayed CO_2 Levels



3.7 Programming the Alarm System

3.7.1 Setting High & Low Temperature Alarms

1. Press the **enter** & ▼ keys simultaneously to enter the alarm menu. The display will show *°C. AL.*
2. Press the **enter** key to display the High Temperature Alarm, *HI 37.5*. The factory setting is the setpoint value (37.0ºC) + 0.5°C.
3. If you wish to adjust the High Temperature Alarm, use the ▲ or ▼ key. The minimum setting, however, is 0.5°C from setpoint.

4. Press the **enter** key to save the setting, whether or not you have changed it. Now the Low Temperature Alarm is displayed, *LO 36.5*. The factory setting is the setpoint value (37.0ºC) - 0.5°C.
5. Use the ▲ or ▼ key if you wish to adjust the value.
6. Press the **enter** key to accept the setting, *whether or not you have changed it*.

3.7.2 Setting the CO_2 High & Low Alarms

1. While you are still in the alarm menu (*see Step 1 of Section 3.7.1 above*), press the ▲ key. The display will show *CO2 AL*.
2. Press the **enter** key to display *HI .5.5*. The factory setting is the setpoint value (5.0%) + 0.5%.
3. If you wish to adjust the High CO_2 Alarm, use the ▲ or ▼ key. The minimum setting, however, is 0.5°C from setpoint.
4. Press the **enter** key to save the setting, *whether or not you have changed it.* Now the Low CO_2 Alarm is displayed, *LO 4.5*. The factory setting is the setpoint value (5.0%) - 0.5%.
5. Use the ▲ or ▼ key if you wish to adjust the value.
6. Press the **enter** key to accept the setting, *whether or not you have changed it.*

3.7.3 Door Open Alarm

When you open the door, an alarm will sound after a preset time delay. If you wish to adjust the time delay:

1. In the alarm menu (*see Step 1 of Section 3.7.1 above*), press the ▲ key, the display will show *doo r.AL* (reading across both displays)**.**
2. Press the **enter** key and the ▲ & ▼ keys to adjust the time (as you scroll through the available choices, you will see *15*, *30*, *45*, *60*, *75* & *90* seconds, then *OFF*).
3. Press the **enter** key to save the desired value.

3.7.4 Alarm Duration

The following steps will adjust the length of time during which **all audible alarms** will last:

1. In the alarm menu (*see step 1 of Section 3.7.1 above*), press the ▲ key. The display shows *PEr .1od* (reading across both displays)**.**
2. Press the **enter** key and the ▲ & ▼ keys to adjust the Alarm duration (as you scroll through the available choices, you will see *OFF*, *10 SEc*, *30 SEc*, *60 SEc*, *600 SEc*, *1 Hr*, then *On*).

3. Press the **enter** key to select the desired value.

3.7.5 Alarm Arming Delay

This is the length of time that is allowed for the Temperature and CO_2 to recover after you open the incubator, and before the Alarm System is armed again. This helps prevent unnecessary alarms from occurring. To change the delay:

1. In alarm menu (*see step 1 of Section 3.7.1 above*), press the ▲ key. The display will show *dr .dEL* (across both windows).
2. Press the **enter** key and the ▲ & ▼ keys to adjust the Alarm Arming time (as you scroll through the available choices, you will see *0.15 Hr*, *0.20*, *0.30*, *1.00*, then *OFF*).
3. Press the **enter** key to select the desired value.

Press ⬣ to return to the main alarm programming menu, and press ⬣ again to return to the main display.

NOTE:
When alarm delay is set to OFF, the Alarms will arm only when the programmed setpoint is reached.

3.8 Chamber Alarm System

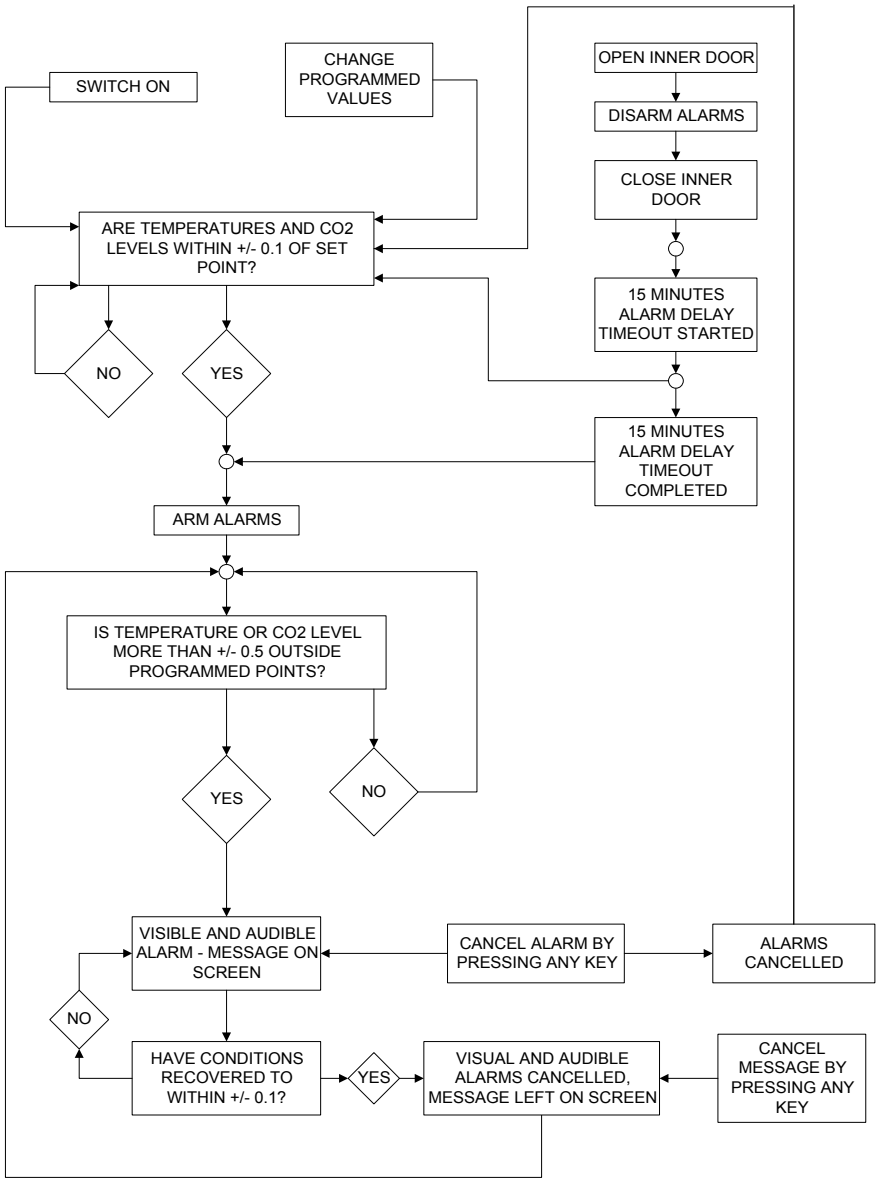
When the incubator is switched **ON**, or after any values have been reprogrammed, the Alarm System is inactive until the setpoint values (± 0.1) are achieved, after which the Alarm System is armed. *See Figure 8,* Chamber Alarm System Flow Chart, *on the following page.*

If temperature and/or CO_2 levels deviate more than the programmed amount, the display flashes, the audible alarm sounds and a message appears on the screen. You can acknowledge (and cancel) the alarm by pressing any key.

When the inner door (if fitted) is opened, the Alarm System is disabled. When you close the outer door, the preset Alarm Arming Delay starts. When the delay time expires, the Alarm System is rearmed; if the temperature and/or CO_2 should fall below or rise above the alarm setpoints, the alarm will be activated. If chamber conditions recover within the Alarm Arming Delay time, the Alarm System will be rearmed but no alarm will be activated.

If an alarm is not acknowledged but the chamber conditions subsequently recover, the audible alarm will be cancelled but the alarm message will remain on the screen to alert the user to the fact that an alarm has occurred. You can cancel this alarm message by pressing any key. The duration of the audible alarm can be adjusted from inactive to continuous (s*ee Section 3.7.4 above*).

Figure 8: Chamber Alarm System Flow Chart


SWITCH ON
CHANGE PROGRAMMED VALUES
OPEN INNER DOOR
DISARM ALARMS
CLOSE INNER DOOR
ARE TEMPERATURES AND CO2 LEVELS WITHIN +/- 0.1 OF SET POINT?
15 MINUTES ALARM DELAY TIMEOUT STARTED
NO
YES
15 MINUTES ALARM DELAY TIMEOUT COMPLETED
ARM ALARMS
IS TEMPERATURE OR CO2 LEVEL MORE THAN +/- 0.5 OUTSIDE PROGRAMMED POINTS?
YES
NO
VISIBLE AND AUDIBLE ALARM - MESSAGE ON SCREEN
CANCEL ALARM BY PRESSING ANY KEY
ALARMS CANCELLED
NO
HAVE CONDITIONS RECOVERED TO WITHIN +/- 0.1?
YES
VISUAL AND AUDIBLE ALARMS CANCELLED, MESSAGE LEFT ON SCREEN
CANCEL MESSAGE BY PRESSING ANY KEY

3.8.1 Temperature Sensor System Alarms

There are four temperature sensors: two in the door and two in the chamber. If any of these sensors should fail, the following message will appear: °C FAIL.

Because the incubator can no longer control temperature properly without the failed sensor, the heating will switch off and the incubator will cool down to room temperature.

If, however, a sensor fails but subsequently corrects itself, the temperature control will restart and an alarm message will remain on the temperature side of the display: SAL ... (meaning Sensor Alarm).

This message can be cancelled by pressing any key.

3.8.2 Over-Temperature Cut-out & Alarm

This alarm only occurs if the chamber temperature exceeds the Temperature setpoint by 1°C or if one of the heating elements exceeds a specific activation threshold. The activation threshold is set at the factory and cannot be adjusted.

Following activation, the over-temperature cut-out & alarm system operates in two sequential modes:

Mode 1: The over-temperature cut-out & alarm activates and cuts power to the heating elements and the CO_2 control valve. The condition is shown on the display by the message CE r1P. When the chamber temperature has fallen to the programmed setpoint, the system changes to Mode 2.

Mode 2: The control system then tries to maintain the chamber temperature at the programmed level by switching the heating elements on and off, using an emergency control method that is, however, less precise. The message EAL_ will flash on-screen to signal that an over-temperature fault occurred and the incubator is being controlled by the emergency control system. *This message cannot be cancelled via the keypad.*

Normal temperature control can be regained and the over-temperature cut-out & alarm can be cancelled by reprogramming the temperature, opening and closing the door, or switching the incubator off and then back on.

If the problem persists, the alarm will recur; if this happens, please contact your service representative or your distributor immediately.

3.8.3 CO_2 Control System Alarm

This alarm only occurs if the CO_2 AutoZero cannot reference the sensor signal to atmosphere. If this is the case, at the end of the AutoZero procedure, the following message will appear: CO2 AUtO 2Er0 FAI LEd. This means that the CO_2 sensor is defective and requires replacement.

If this alarm occurs, contact your service representative immediately.

3.8.4 Review of Alarm Messages

For easy reference, Table 5 provides an overview of all alarm messages that you may encounter across both displays.

Table 5: Alarm Messages

Message	Meaning	Ref. Section
doo r.AL	door open	3.7.3
CF AIL	temperature sensor failure	3.8.1
SAL	sensor alarm after sensor recovers	3.8.1
CtrIP	over-temperature cut-out has cut power to heating elements and CO_2 valve	3.8.2
tAL	over-temperature defect has occurred and system is under emergency control	3.8.2
CO2 AUtO 2Er0 FAILEd	CO_2 sensor is defective and needs to be replaced	3.8.3

4 ROUTINE MAINTENANCE

4.1 General Notes

To ensure that chamber conditions remain as stable as possible, be sure to minimize the length of time that the inner door (if fitted) is open. The magnetic door catches are specifically designed to make door opening and closing as easy as possible. When you open the door, wipe off any small drops of condensate that may have formed on the inner seal. This will avoid a build-up of condensation.

If you are using the humidity tray for humidification, be sure to follow the indications provided in *Section 3.3.*

NOTE:
There is no need to remove the top panel for normal maintenance or servicing, so if you have two incubators stacked, the upper incubator does not have to be moved when you are servicing the lower incubator.

4.2 Daily Checks

1. Check that the temperature and CO_2 levels are reading within specification.

2. Check the reserve pressure in the CO_2 cylinder (normally 725 psi or 50 bar when full). The design of the incubator ensures very low consumption of CO_2: during normal working conditions, a typical large cylinder should last approximately 12 months. If there is a significant drop in the cylinder pressure from 725 psi or 50 bar, it means that the cylinder is almost empty and should be replaced. Ensuring that there are no leaks at any of the connections will ensure a greater lifetime to the CO_2 supply and will help avoid accidentally running out of CO_2.

3. Any spills in the chamber should be cleaned immediately to protect the stainless steel surfaces.

4.3 Monthly Checks

1. Refill the humidity tray (to a maximum volume of 0.2 liter). The use of warm distilled water (~ 37.0°C) will ensure a rapid return to optimum chamber conditions. After refilling, check that the humidity tray is situated between the shelf rack supports.

2. If required, you can take a sample of the gas inside the chamber using the CO_2 sample port, and check it using a CO_2 gas analyzer. The CO_2 sample port is located on the lefthand side of the rear panel (*see Figure 5*).

   If you conduct a sampling, please take the following precautions:

   - Turn off the CO_2 gas by reprogramming the setpoint for CO_2 to 0.0% to prevent CO_2 from being injected into the chamber, which would give a false reading.
   - Use a flow rate ≤ 0.5 liters/minute to take the sample.
   - Keep the outer door closed.
   - Remember to reset the CO_2 setpoint to the desired level after sampling.

   We recommend that you perform a CO_2 AutoZero prior to sampling (*see Section 3.5*).

3. We also recommend that you AutoZero the CO_2 system once a month to ensure that the CO_2 level is correct.

5 CLEANING & DISINFECTING

5.1 Cleaning

1. Routinely clean the exterior of the incubator by wiping it over with a soft cloth moistened with soapy water.
2. Rinse the soap from the cloth in clean water, and wipe the exterior surfaces again.

CAUTION!

Be sure to use only approved cleaning fluids and materials. Solvents, chloride-based cleaning substances and abrasive materials, among others, may cause permanent damage to the product surfaces. Also be sure to wipe all surfaces dry, leaving them free from any foreign particulates or fluids which could cause subsequent surface damage. (See the CAUTIONs in Section 5.2).

5.2 Disinfecting

The recommended disinfecting agent for use with the incubator is a solution of 70% isopropanol (iso-propyl alcohol) and 30% distilled water. Be sure to follow appropriate safety regulations while you are using this solution:

WARNING!

- **As a routine precaution, wear protective gloves.**
- **Be sure to adequately ventilate the work area as you are disinfecting, to avoid the formation of potentially explosive alcohol vapors.**
- **Protect all electrical connections from contact with the alcohol solution.**

To best protect yourself, your incubator and your work area, follow these instructions:

1. Program 0.0% CO_2 and switch off the incubator, then unplug the incubator from the power supply.

2. Dampen a clean cloth with the alcohol solution and wipe down all external surfaces, taking care to keep the alcohol solution from coming into contact with any electrical outlets or assemblies.

3. Remove all of the shelves, the humidity tray, and the shelf racks.

CAUTION!

It is very important to ensure that no liquid is spilled onto the white porous CO_2 sensor cover at the rear of the chamber (see Step 4). Failure to use the protective cover could result in damage to the sensor and may affect your warranty.

4. Place the black protective cover over the CO_2 sensor.

5. You can clean the humidity tray by rinsing it in sterile water, wiping it down with the alcohol solution, and then rinsing it with sterile water.

6. Wipe down the inside of the chamber with the alcohol/water solution, and leave it to dry completely.

CAUTION!

Never use any of the following substances to clean the stainless steel or damage will result: Sodium Azide, Aqua Regia, Iodine, Ferric Chloride or Sulphuric Acid.

7. Wipe the internal components of the chamber twice with the alcohol/water solution. Wipe off excess liquid and leave it to dry completely.

8. Reassemble the shelf racks, the humidity tray and the shelves, before switching the incubator on.

9. Be sure to remove the protective cover from the sensor and put it back in the holder for safekeeping.

10. When you reinstall it, ensure that the humidity tray is centered between the shelf rack supports. Refill the humidity tray (*as explained in Section 3.3*).

11. Leave the incubator on for at least two hours (preferably overnight) to allow conditions to stabilize.

12. When the incubator has stabilized, carry out an AutoZero and reprogram the desired CO_2 level. It may be necessary to open the door briefly if, after performing an AutoZero, the CO_2 level is too high.

6 SPECIFICATIONS

Model 14 S Incubator Specifications	
Temperature Management	▪ Digital programming via microprocessor control in 0.1°C increments. Measurement of chamber, outer door & both heating element temperatures via 4 RT[1] matched thermistors (sensitivity 0.01°C) ▪ "Out of Limits" temperature protection system independent of microprocessor control.
Range	5°C above ambient temperature[2] to 50°C
Control	± 0.1°C
Stability	± 0.1°C
Uniformity	≤ ± 0.2°C
CO_2 Control	Solid-state infrared CO_2 sensor operating independent of humidity. Semi-automatic CO_2 zeroing facility.
Range	0.2 - 20%
Control	± 0.1%
Stability	± 0.2%
Uniformity	± 0.1%
Recovery Rate	Better than 0.7%/minute
Gas Connections	6mm/ ~1/4-inch tubing
Required Gas Pressure	0.35 bar / 5 psi
Relative Humidity	Removable stainless steel humidity tray.
Reservoir Capacity	0.3 liters (Fill to 0.2L)
Humidity Control	90% to 95% (condensation may occur at the High setting)
Shelves	Stainless steel, non-perforated (standard).
Capacity	405 cm^2 per shelf
Number of Shelves	2 standard; with multiple position option, up to 4 shelves
Alarm Systems	Two-level alarm system giving programmable audio/visual warnings with options for remote communication. Level 1 signals system failures; level 2 is programmable and monitors chamber conditions.
Dimensions	
Chamber (HxWxD)	294 x 233 x 208mm 11.6 x 9.2 x 8.2 inches
Chamber Volume	14 liters 0.5 cu. ft.
External (HxWxD)	454 x 313 x 285mm 17.9 x 12.3 x 11.2 inches
External, Crated (HxWxD)	580 x 440 x 400mm (pallet included) 22.8 x 17.3 x 15.7 inches (pallet included)

...continued...

1 RT = Resistance Temperature curve

2 If the incubator is to be run close to ambient temperature, it may be necessary to make some adjustments to the control parameters to avoid temperature overshoot. Contact your NBS representative for details.

Model 14 S Incubator Specifications	
Weight	Crated: 18.5 kg / 40.8 lbs Uncrated: ~ 12.5 kg / 27.6lbs (with standard features)
Grounded Electrical Supply	
Voltage:	110-120V 50/60Hz or 220-240V 50/60Hz
Power:	▪ 500 watts
Energy to maintain 37°C:	< 0.06 kwh (at room temperature between 20-25°C)
Storage Temperature	10 - 50°C

NOTE:

Factory calibration of the incubator is carried out at 37ºC, 5.0% CO_2 with humidification, in an ambient temperature of 20-25ºC with no heat-generating apparatus inside the chamber.

Software calibration adjustments may be required to optimize performance if the incubator is being used well outside these operating conditions. Performance specifications may also be affected.

For advice on calibration adjustments and relevant performance specifications, contact NBS. Please be prepared with the model and serial number of your incubator and the complete details of your operating conditions.

6.1 Certifications

The *CE Declaration of Conformity* is reproduced on the following page.

New Brunswick
an eppendorf company

CE Conformity Certification

Galaxy 14 S
Declaration of Conformity

Declare that the Galaxy 14 S CO_2 Incubator Model Numbers CO14S-120-0*00 and CO14S-230-0*00 to which this declaration relates are in conformity to the following standards:

EN 61010 - 1 1993 Safety requirement for electrical equipment for measurement, control and laboratory use.
(Classification Class 1, Installation Category 11, Pollution Degree 2)

EN 50081 - 1 1992, EN 50082 - 1 1992, Electromagnetic Compatibility
(Generic Emission / Immunity Standard)

Following the provision of:

Directive 73 / 23 / EC Low Voltage
Directive 89 / 336 / Electromagnetic Compatibility

Mike King
Managing Director,
New Brunswick UK Operations

9th April 2009

QF49

RS Biotech Laboratory Equipment Ltd., 1 Drummond Crescent,
Irvine, Ayrshire, KA11 5AN, SCOTLAND, UK

RS Biotech is part of
New Brunswick Scientific
an Eppendorf company.

7 OPTIONS & ACCESSORIES

7.1 Options

Some combinations of options may not be possible. Others may incur extra cost. Please inquire before ordering.

Option	NBS Part Number
Oxygen Control (1-19%)	CO14S-120-0200 (120V) CO14S-230-0200 (230V)
BMS Alarm Relay Contact	P0628-6300

7.2 O_2 Control (1-19%) Option

This oxygen control option is designed to cover the 1-19% range by adding nitrogen to bring the level below ambient.

7.2.1 Setting Up the N_2 Tank

Before you set up your oxygen control, be sure you have the proper equipment for your nitrogen supply:

- 2 cylinders of nitrogen, regulation size W
- 1 two-stage pressure regulator
- 1 Inline pressure regulator
- 6mm PVC tubing
- tubing clips

Set up the nitrogen tanks as follows:

1. Inspect them to be sure there are no leaks or other damage.
2. Check that the two-stage pressure regulator valve and the inline pressure regulator valve are closed by trying to turn their knobs in a counter-clockwise direction; the knobs should be at the stop point.
3. Place the inline pressure regulator close to the incubator.
4. Securely attach the two-stage pressure regulator to the nitrogen tank's outlet and to the inline pressure regulator's inlet with tubing, securing both ends with clips.
5. Connect the inline pressure regulator's outlet to the incubator's N_2 inlet on the lower lefthand side of the equipment tray as you face the rear panel; secure both ends with clips.

See important **NOTE** on the following page.

NOTE:
To add an automatic gas cylinder changeover instrument: with the incubator turned off, connect its inlet to the two-stage pressure regulator's outlet, and the changeover instrument's outlet to the inline pressure regulator's inlet with tubing, securing the ends with tubing clips.

7.2.2 Setting Up Oxygen Control

1. Remove the red plastic protective cover from the hydrophobic filter cap (*making sure that the hydrophobic filter cap is not removed with it*), located in the rear wall of the incubator chamber. Retain the cover for use when you clean the chamber.

2. Open the nitrogen gas supply from the tank. Set the N_2 tank's outlet pressure gauge to 1.5 bar.

3. Set the nitrogen regulator to 0.35 bar (5 psi). The nitrogen will be fed into the incubator through a HEPA filter that is already installed in the gas line. The gas flow rate is approximately 20 liters/minute.

NOTE:
If the programmed O_2 level is close to the ambient oxygen, it may be necessary to reduce the cylinder pressure below 1 bar to stop the oxygen level from undershooting the programmed value.

4. After the incubator has been humidified and left overnight to stabilize, the oxygen sensor should be referenced to atmosphere (*see Section 7.2.4*).

5. Enable the oxygen control: (a) enter the *O2.cont* menu by pressing and holding the ▲ key, then pressing the ⬣ key; *O2.cont* should appear on the display (if it does not, press the ▲ or ▼ key until it appears); now press the **enter** key; (b) using the ▲ or ▼ key, select *On* or *OFF* to enable or disable oxygen control; (c) press the **enter** key to store the change; (d) press the ⬣ key repeatedly until you return to the Main screen.

6. Program the required oxygen level: (a) from the Main menu, press the ⬣ key, then press the **enter** key twice; the screen should display *O2 . 19.0* and the 19.0 should be flashing; (b) now use the ▲ or ▼ key to set the desired oxygen level; (c) press the **enter** key to store the change.

The oxygen alarm levels are set automatically to ±0.5% of the programmed value, but you can modify them in the alarm menu, as explained in Step 7:

7. To set the oxygen alarm levels: Set the oxygen level alarms: (a) press and hold the ▼ key and press the **enter** key to enter the alarm menu; (b) use the ▲ or ▼ key to scroll through the menu until *O2 . AL* is displayed, then press the **enter** key. (c) The High alarm is displayed first; use the ▲ or ▼ key to set the desired alarm level, then press the **enter** key to store the change; (d) the Low alarm is now displayed; use the ▲ or ▼ key to set the desired alarm level, then press the **enter** key to store the change.

NOTE:
The alarm values cannot be set to less than 0.5% of the programmed value.

NOTE:
When using the incubator at low oxygen levels, it is possible that the CO_2 and O_2 levels may not fully recover within the default alarm limit of 15 minutes after the door was opened. This alarm delay time period can be modified in the alarm menu: (a) enter the alarm menu as indicated in Step 7 above; use the ▲ or ▼ key until *dr . dEL* is displayed; (b) press the enter key; (c) use the ▲ or ▼ key to increase the door delay value; (d) press the enter key to store the change; (e) press the ⬣ key repeatedly until you return to the main screen.

8. By finely adjusting the CO_2 and N_2 gas inlet pressures, oxygen control can be tailored to achieve the programmed oxygen and carbon dioxide levels at approximately the same time.

7.2.3 Operating Guidelines

We recommend that you reference the oxygen sensor to atmosphere (*see Section 7.2.4*) once a month to ensure that any long-term drift in sensor output will be corrected. Be sure to do it at the chamber operating temperature.

When you are cleaning the chamber, be very careful not to wet the oxygen sensor or CO_2 sensor. Never use solvents on the sensor membrane; rather, be sure to cap the hydrophobic filter before you clean. In fact, it is good practice to replace the filter each time you clean the incubator chamber, to avoid the possibility of filter contamination.

Under normal relative humidity conditions (ambient up to 95%), the oxygen sensor's performance should not be affected. If, however, liquid condenses around the sensor, gas flow may become restricted, giving the sensor a low signal. This may occur if there is a large liquid spill inside the chamber or if the incubator is turned off while it is fully humidified. Should such condensation appear, normal operation can be restored by:

- removing the humidity tray,
- drying the chamber completely,
- and then running the incubator at 37°C for one hour.

This will dry out the sensor(s). The humidity tray can then be reinstalled and the incubator can be safely re-humidified.

7.2.4 Referencing to Atmosphere

The oxygen sensor is a self-powered electrochemical cell that has a finite life dependent on the ambient oxygen level. A typical lifespan is 1-2 years at atmospheric levels. During the sensor's lifespan, the signal produced will slowly degrade until it is ultimately unusable. For this reason, we recommend that you reference the sensor to atmospheric oxygen levels on a monthly basis.

The sensor is automatically referenced to atmospheric oxygen levels when you enter the oxygen control menu. To do this:

1. First, make sure the incubator has been humidified and left overnight to stabilize.
2. Hold the ▲ key, then press the ⬣ key; the display will read *O2.cont*.
3. Press the ▲ key until the display reads *O2 . rEF*, then open the incubator door.
4. The display will begin a 60-second countdown timer (*cd . 59*, *cd . 58*, *cd . 57*, etc.). When the countdown period has elapsed, close the incubator door.
5. The oxygen control system will allow the oxygen sensor to stablize for ten minutes after the door is closed. Once it has stablized, the control system will reference the sensor to atmopheric oxygen level. The reading is automatically adjusted to 19.7%, which is the true reading taking into account the relative humidity in the chamber.

During the oxygen sensor reference to atmosphere procedure, the control system measures the sensor output to estimate the remaining sensor life. There are three possible outcomes. The first is that the referencing procedure was successful, and no further action is needed. In this case, the following scrolling message will be displayed: *OHY.9En SEn.Sor OH*, then *O2.rEF in rAn.9E*.

The the other possible outcomes are presented in detail in Sections 7.2.5 (*Replace Sensor Soon*) and 7.2.6 (*Replace Sensor Now*). See also Section 7.2.7 for instructions on removing and replacing the sensor.

7.2.5 Replace Sensor Soon

If the referencing procedure was successful but the sensor is nearing the end of its working life, the following scrolling message will be displayed:
o2.rEF SEnSor nEA.r End.oF L iFE bUt.iS in. rAn.GE

In this case, the sensor will need to be replaced soon. See Section 7.2.7 for instructions on removing and replacing the sensor.

7.2.6 Replace Sensor Now

If the referencing procedure failed, oxygen control will automatically be disabled until a new sensor is installed and correctly referenced to atmosphere. The following scrolling message will be displayed:
o2r.EF FAiLEd SEnSor At. End.oF L iF.E
o2. con.trL oFF.

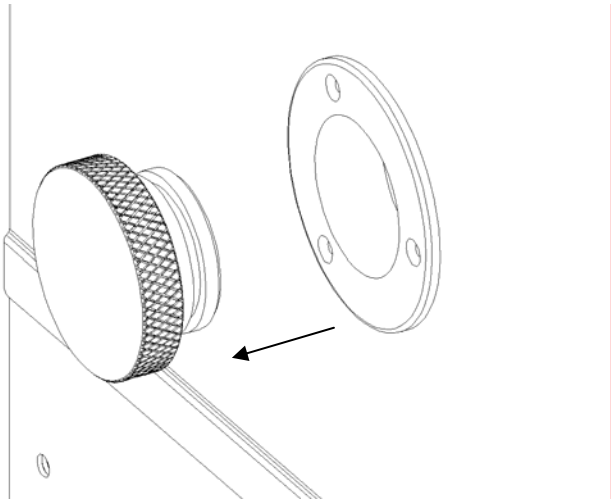
If the sensor fails the referencing procedure, first repeat the procedure to confirm the result. Then see Section 7.2.7 for instructions on removing and replacing the sensor.

7.2.7 Removing & Replacing O_2 Sensor

To remove and replace the oxygen sensor, you will need the sensor removal tool provided (*see Figure 10 on the following page*):

1. Pull the rear access cover (*see Figure 9 below*) off the rear outside wall of the incubator to gain access to the oxygen sensor.

Figure 9: Oxygen Sensor Rear Access Cover



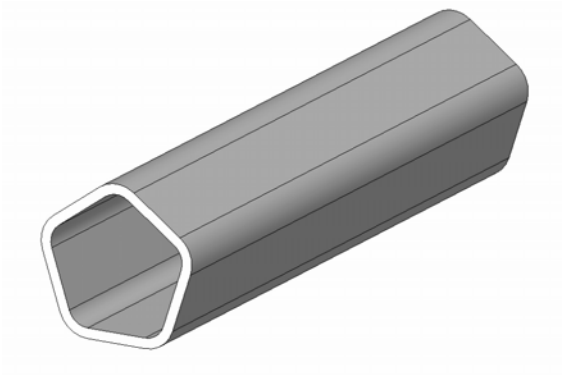
2. Reach inside and disconnect the sensor by unplugging the connector: *be sure to grasp the white connector body, not the wire leads!*

WARNING!

Never pull on the wire leads; disconnect the white connector body.

3. Using the sensor removal tool (*see Figure 10*), unscrew the oxygen sensor by turning it counter-clockwise. *Because the oxygen sensor contains lead, be sure to dispose of it according to local regulations.*

Figure 10: Oxygen Sensor Removal Tool



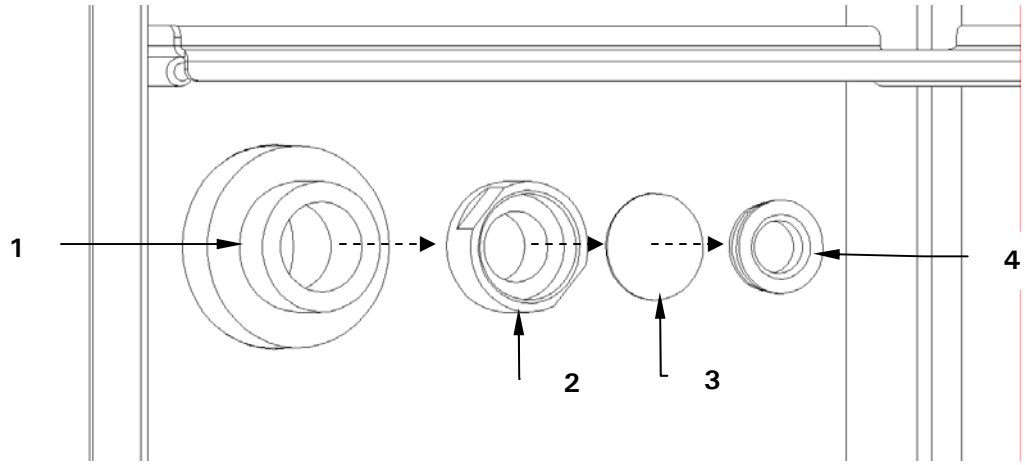
4. Using the sensor removal tool, install the new oxygen sensor by turning it clockwise until it is finger-tight. *Do not use excessive force or any metal tool*.
5. Reconnect the sensor by plugging the white connector body back in.

6. Make sure that the sensor wires are inside the metal sensor tube to protect them from damage, then press the rear access cover snugly back in place.
7. After replacing the sensor, humidify the incubator and allow it to stabilize overnight.
8. Calibrate the sensor with reference to the atmospheric oxygen level (*see Section 7.2.4*).

7.2.8 Replacing the Filter Disc

The hydrophobic filter installed on your Oxygen Control system helps prevent condensation from reaching the sensor (*see Figure 11 on the following page*).

Figure 11: Hydrophobic Filter & Holder Assembly (exploded view)



1	Oxygen sensor holder (on rear wall of incubator)	3	Hydrophobic filter disc
2	Hydrophobic filter holder (screws into sensor holder)	4	Hydrophobic filter cap

To replace the hydrophobic filter disc (membrane), with reference to Figure 11 above:

1. Carefully unscrew the hydrophobic filter holder from the oxygen sensor holder on the rear wall of the chamber.
2. With a fingertip or a 10-11mm (½-inch) rod, from the rear of the filter holder, *gently* push the filter membrane disc and the filter cap out of the holder.
3. Clean and dry the filter holder and cap.
4. Wearing gloves to avoid contaminating the filter disc, gently place the new filter membrane disc into the filter holder recess. The filter disc works in both directions, so there is no right or wrong side.
5. Make sure the O-rings (between the cap & filter holder and between the filter holder & oxygen sensor holder) are undamaged and securely in place.
6. Gently press the filter cap back in.
7. Carefully screw the hydrophobic filter holder back into the oxygen sensor holder.

7.2.9 Troubleshooting the Oxygen Sensor

If the oxygen sensor fails suddenly, it is very likely that the sensor inlet membrane has become blocked by condensation.

To dry the membrane:

1. Remove the hydrophobic filter holder assembly by unscrewing it (counter-clockwise).
2. Program the incubator for a temperature of at least 37°C (or higher if you normally operate the incubator at a higher temperature).
3. Close the door and allow the temperature to recover.
4. Reopen the door for 15 seconds to release any build-up of humidity.
5. Repeat steps 3 and 4 every 30 minutes or so. The oxygen level should rather suddenly recover after a few hours.
6. Leave the incubator for a few more hours to be sure that the sensor membrane has thoroughly dried out.
7. Replace the hydrophobic filter disc following the instructions in Section 7.2.8.
8. Re-humidify the incubator.
9. After 2 or 3 hours, reference the oxygen sensor to atmosphere (*see Section 7.2.4*). When the referencing has been successfully completed, the incubator is ready for use.

7.2.10 Specifications

The Oxygen Control option has the following characteristics:

Sensor Type	Self-powered, diffusion-limited, electrochemical cell with temperature compensation.
Zero Signal in Nitrogen	< 50 µV
Temperature Compensation	± 2% of signal variation from 0-40°C
Relative Humidity Range	0-99%, non-condensing
Operating Temperature Range	-20°C to +50°C
Resolution	0.01% Oxygen
Expected Operating Life	1-2 years in ambient oxygen
Hydrophobic Filter Operating Life	No data available on the filter lifespan but we are confident to expect it will last at least 6 months.
Nitrogen Input Rate	20 l/min at 5 psi
Typical Oxygen Reduction Rates	3 minutes to 16% 4 minutes to 11% 8 minutes to 6%

7.3 BMS Relay Contact Alarm Option

The BMS (Building Management System) Relay Contact Alarm allows a signal from a central alarm system to be switched **ON** or **OFF** to indicate an alarm condition at the incubator.

The following alarms would activate the system: over-temperature, under-temperature, system failure, CO_2 high and CO_2 low.

As an integral option, the alarm can be programmed to indicate when the power fails (perhaps due to an electrical fault) or is switched off. If the power failure warning is active, the relay contacts will be reversed (pin 4, which is normally open, becomes normally closed and pin 6, which is normally closed, becomes normally open). The alarm will also respond to other types of alarm, depending on the options installed on the incubator.

The system is connected low at the middle of the equipment tray, as you face the rear panel, via a standard 6-pin DIN socket (*see Figure 12*). The matching plug is provided, when the option is installed, in the accessories bag.

Figure 12: BMS Relay Contact Alarm Socket

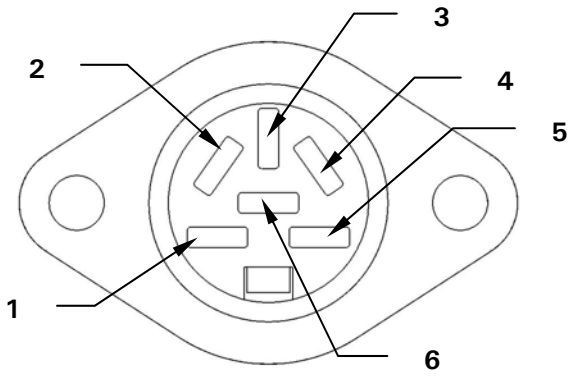


Table 6: BMS Relay Contact Alarm Socket Pin Designation

Pin	Designation	
1	12VDC unregulated	To power external equipment such as a remote buzzer or light (100mA maximum current available).*
2	0V	
3	5VDC	Via 10KΩ pull-up resistor, for a logic signal to directly control an auxiliary control system.*
4	Normally closed	To access the relay contacts. Contact limits are 3 Amps @ 24V DC and 3 Amps @ 34 VAC.
5	Common	
6	Normally open	

*Cable length should not exceed 3 meters (9.8 ft) to comply with EMC requirements.

To turn the BMS relay contact alarm option **ON**:

1. Press the **enter** and ▼ keys simultaneously to enter the alarm menu.
2. Press the ▲ key until *rEL.AY* is shown in the display.
3. Press the **enter** key to select this option.
4. The default setting is **OFF**, which reads *nO* in the display. Press the ▲ key to change the display to *YES* (**ON**). To deactivate the option, you can press the ▼ key to return the display to *nO* (**OFF**).
5. Press the **enter** key to accept the selection.
6. To return to the main (temperature and CO_2) display screen, press the ⬣ key twice.

7.4 Available Accessories

Table 7: Available Accessories

Accessory	NBS Part Number
CO_2 Bottle Automatic Change-Over Controller	P0628-5000
CO_2 Two Stage Regulator	P0628-5010
CO_2 Supply Line Filters, HEPA	P0628-5020
In-Line Pressure Regulator	P0628-5030
CO_2 Gas Analyzer Kit	P0628-5040
10 Spare CO_2 Gas Analyzer Tubes	P0628-5050
Electronic CO_2 Gas Analyzer	P0628-6150
Stacking Bracket For 2 incubatorss (prevents accidental tipping)	P0628-6230
Extra Shelf, Non-perforated	P0628-6180
Extra Humidity Tray, 0.3 liter	P0628-6200
Multi-Position Wire Shelf Racks (4-position)	P0628-6170
Inner Glass Door	P0628-6210

8 DRAWINGS & TABLES

8.1 List of Drawings

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8.2 List of Tables

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